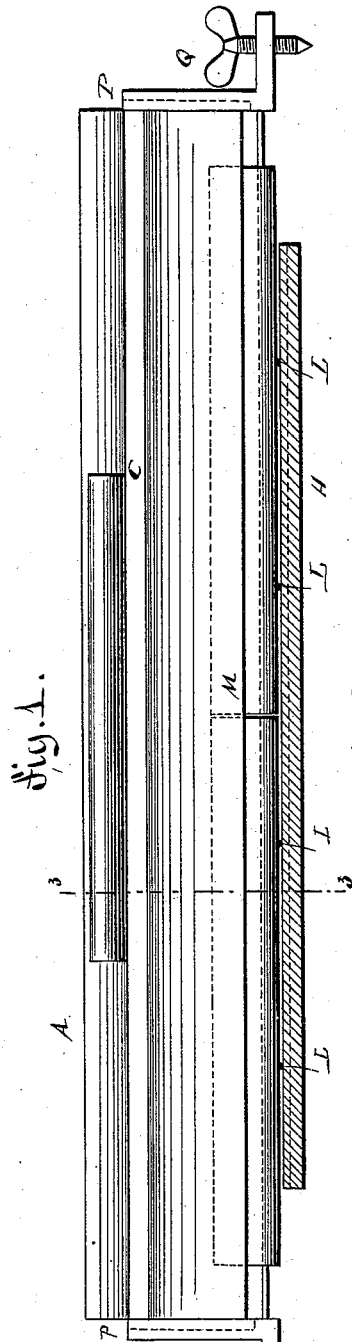


J. H. SMITH.

APPARATUS FOR COATING PHOTOGRAPHIC PLATES WITH EMULSION.

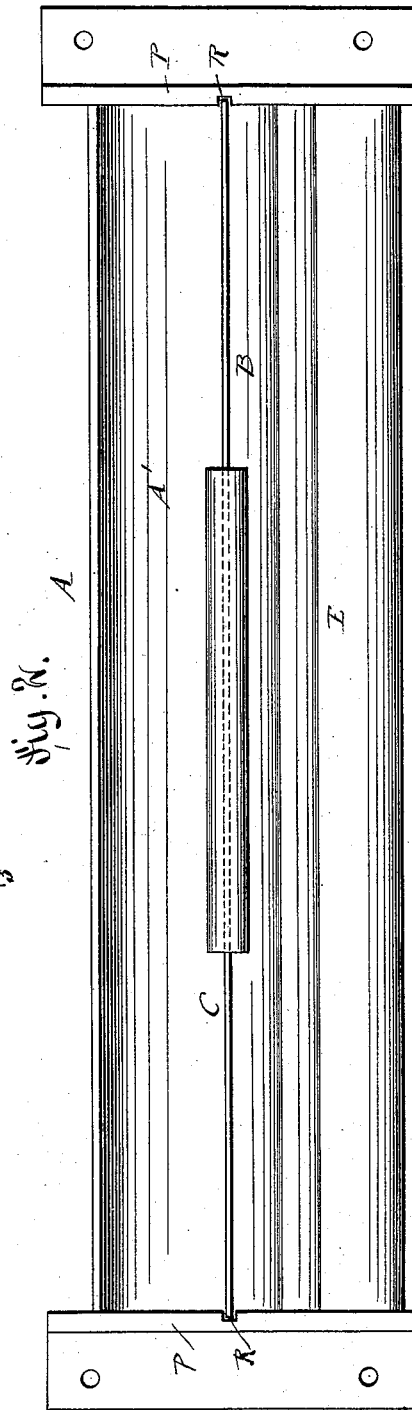
No. 455,954.

Patented July 14, 1891.



WITNESSES:

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W. H. Reinher.



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Forrest Riegner

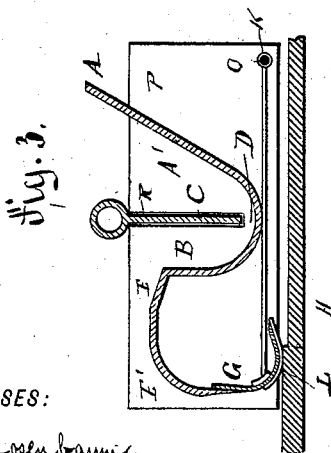
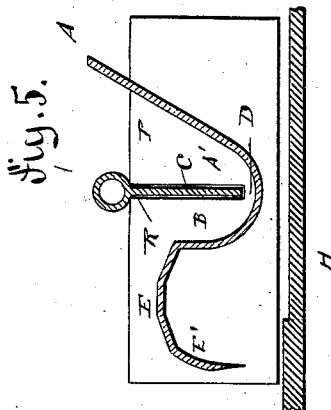
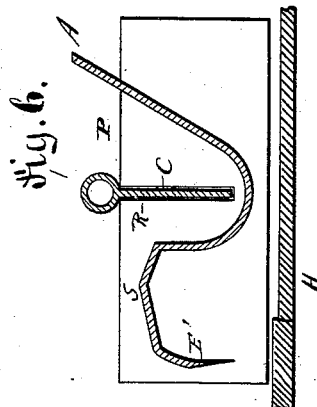
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APPARATUS FOR COATING PHOTOGRAPHIC PLATES WITH EMULSION.

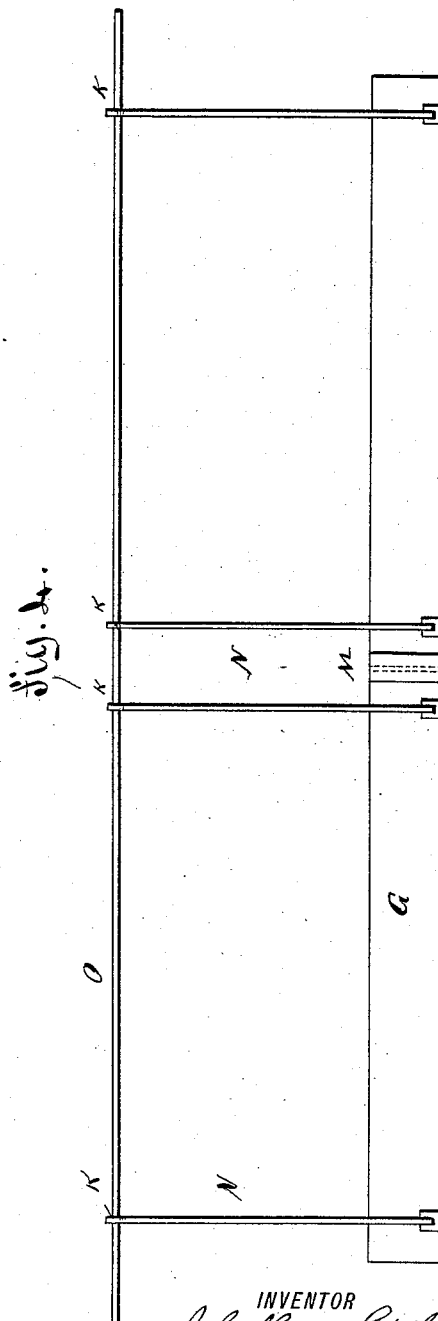
No. 455,954.

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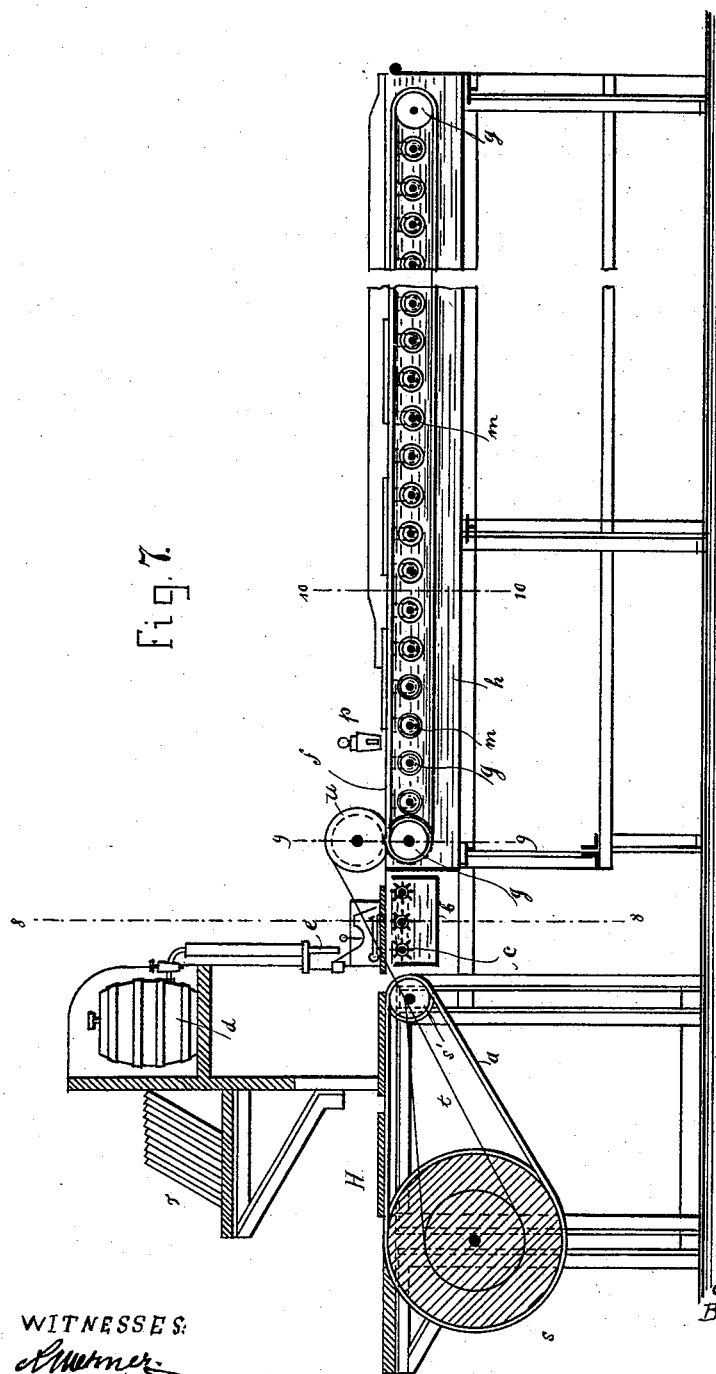
(No Model.)

4 Sheets—Sheet 3.

J. H. SMITH.

APPARATUS FOR COATING PHOTOGRAPHIC PLATES WITH EMULSION.
No. 455,954.

Patented July 14, 1891.



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APPARATUS FOR COATING PHOTOGRAPHIC PLATES WITH EMULSION.

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Fig. 8.

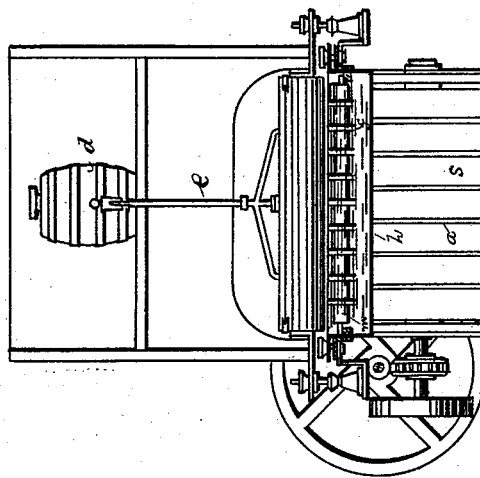


Fig. 10.

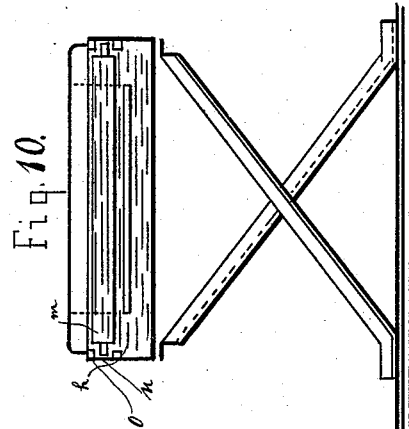
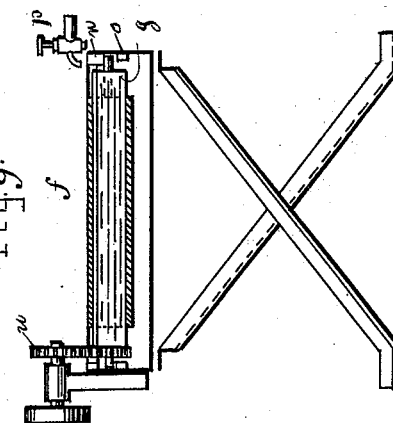


Fig. 9.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN HENRY SMITH, OF LOW FELL, GATESHEAD, ENGLAND.

APPARATUS FOR COATING PHOTOGRAPHIC PLATES WITH EMULSION.

SPECIFICATION forming part of Letters Patent No. 455,954, dated July 14, 1891.

Application filed November 15, 1889. Serial No. 330,397. (No model.)

To all whom it may concern:

Be it known that I, JOHN HENRY SMITH, a citizen of Great Britain, residing at Low Fell, Gateshead, in the county of Durham, England, have invented certain new and useful Improvements in Apparatus for Coating Photographic Plates with Emulsion; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of my invention is to provide a new and improved apparatus for coating photographic dry-plates or other surfaces with an emulsion or a like viscous fluid in such a manner as to provide a uniform and dry coating or film.

In the accompanying drawings, Figure 1 is a front view of my improved apparatus for coating plates with emulsions or viscous fluids. Fig. 2 is a plan view of the same. Fig. 3 is a cross-sectional view on the line 3 3, Fig. 1. Fig. 4 is a detail plan view of the spreading-plate. Figs. 5 and 6 are cross-sectional views of the apparatus, showing a modified construction. Fig. 7 is a vertical longitudinal sectional view of my improved apparatus for coating plates and the mechanism for cooling and conveying the plates. Fig. 8 is a vertical transverse sectional view on the line 8 8 of Fig. 7. Fig. 9 is a vertical transverse sectional view on the line 9 9 of Fig. 7, and Fig. 10 is a vertical transverse sectional view on the line 10 10 of Fig. 7.

Similar letters of reference indicate corresponding parts.

For the purpose of obtaining an absolutely uniform gelatine film of true uniformity and sufficient thickness on dry-plates the following points must be observed: First, for a plate of a certain size the emulsion must be delivered upon said plate in a uniform quantity at all times; secondly, appliances must be provided by means of which the quantity of emulsion flowing upon the plate can be adjusted according to the width of the plates or the desires of the manufacturer; third, the emulsion must flow upon the plate uniformly

divided as a stripe extending transversely across the plate; fourthly, devices must be provided for preventing irregularities in the surface and thickness of the film; fifthly, plates must be mounted to move uniformly in a perfectly horizontal plane.

After the plates have been coated, and while they are still moving upon a horizontal surface, they must be cooled rapidly, so that the emulsion will congeal rapidly. In order to fulfill the first condition, the emulsion is placed in a receptacle, from which it passes through tubes or siphons, of which one or more can be used, into a trough that is located lower. The outlet of each tube must have a fixed position in a horizontal line directly over the trough. The receptacle is made flat and wide and arranged at such an elevation that the differences in depth of the quantity of emulsion in said receptacle does not materially affect the regularity of the flow of the emulsion. If very exact work is required, even these small variations can be removed by changes in the height of the receptacle, which can easily be accomplished, as the tubes are made partially or entirely of rubber. However, I prefer to use the well-known Mariotte's bottle, as a fluid flows regularly from the Mariotte bottle independent of the height of the fluid in the bottle.

To regulate the flow of emulsion, a scale-valve is placed on each outlet-pipe or changes are made in the height of the receptacle, or both these means may be employed.

In place of the outlet-cock several short tubes with tapered ends and an upright scale can be used, by means of which scale the operator can easily see how much emulsion flows out of each tube in a unit of time when the receptacle is arranged at a certain elevation. The operator thus can tell whether one or more of the said tubes are required and at what elevation the receptacle must be placed for a certain size of plates.

The receptacle can be adjusted higher or lower by means of a rack and pinion or other devices.

To prevent the flow of emulsion from it entirely, cocks or clips are used for closing the outlet-tubes.

For the purpose of spreading the emulsion

uniformly on the plates my improved spreading device is used. The trough A is divided into two compartments A' and B by an adjustable partition C, mounted to slide vertically in vertical guide-grooves R in the end pieces P of the trough. A slot D is formed between the bottom edge of the partition C and the bottom of the trough, and the emulsion flows through said slot from the section A' into the section B, in which latter compartment the emulsion has an absolutely true level surface. The emulsion flows from the compartment B over a horizontal flat surface E, and then down the curved lip E' on the same upon the curved spreading-piece G, which is directly above the plates H to be coated. The shape of the trough can be changed at will; but in order not to interrupt or destroy the regularity of the emulsion flowing from the trough the outlet part thereof must not be provided with any acute angles, but with obtuse angles, as shown in Figs. 5 and 6. If a horizontal surface E is provided, over which the emulsion flows, a more uniform flow is obtained than when the emulsion flows over a ridge or edge S, as in Fig. 6.

Four screws Q in the flanges of the end pieces P serve for adjusting the device horizontally on a table. The plate G is secured to arms N, having eyes K, through which the wire or rod O passes, the ends of which are secured in the end pieces of the trough.

If desired, the spreading-plate G may rest directly upon the plate to be covered, or a number of fine curved wires L may be secured to said spreading device, which keep it a certain distance from the plates H. The spreading-plate G is not limited to the shape shown in Fig. 3, but can have any shape, which, however, must only have obtuse angles. Care must be taken to keep the plate G in contact with the outlet-lip of the trough throughout its entire length and in such a manner as not to interfere with the up and down movements of said spreading device. The inner or bottom edge of the bottom lip of the spreading-plate G must be bent up slightly, so that when a thicker plate follows a thinner plate the edge of the thicker plate can strike the bottom bevel of the upwardly-bent lip and raise the spreading device. When the larger plates are to be covered, the spreading-plate G is provided with one or more joints M.

Other devices may be provided for moving the spreading-plate G vertically or to permit it to move vertically; but the one shown is preferred.

The plates H are carried by endless bands or belts *a* to a trough *b* for receiving the waste emulsion, which trough contains toothed wheels *c* for supporting the plate and moving it forward.

The coating apparatus is arranged above

the trough *b*, and the emulsion flows from the Mariotte bottle *d* through the tubing *e* into the coating apparatus. The coated plates pass upon an endless belt *f*, passed around rollers *g*, having bearings in the ends of the trough *h*, in which trough are also arranged a series of floating rollers *m*, the pivots of which rest in the notches *n n* in the side bars *o*, thus adapting said rollers to pass up and down as the level of the water in the trough *h* rises or descends, but preventing said rollers from moving in the direction of the length of the trough. The endless belt absorbs the water, and as this wet belt comes in contact with the under sides of the plates it keeps them cool, causing the emulsion to congeal very rapidly. The water in the trough is kept cool by constantly admitting cool water through the cock *p* and drawing off the warm water.

In Fig. 8, *r* represents the plates to be coated; *s s'*, the drums over which the endless bands *a* pass; *t*, a belt, and *u* the driving-gear for one of the end rollers *g*.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a device for coating plates with an emulsion or viscous fluid, the combination, with a trough having an overflow-lip projecting laterally and then downward from one edge of the trough, of a curved spreading-plate in contact with said lip, substantially as herein shown and described.

2. In a device for coating plates with an emulsion or viscous fluid, the combination, with a trough having an overflow-lip projecting outward and downward from one edge, of a spreading-plate resting against said lip and mounted to move up and down on the same, substantially as herein shown and described.

3. In a device for coating plates with an emulsion or viscous fluid, the combination, with a trough having an outwardly and downwardly projecting lip along one edge, of a curved spreading-plate resting against said lip and hinged rods to which said spreading-plate is secured, substantially as set forth.

4. In a device for coating plates with an emulsion or viscous fluid, the combination, with a trough having an overflow-lip projecting outward and downward from one edge, of a curved spreading-plate, a Mariotte's bottle, a tube for conducting the liquid from said bottle to the trough, a series of horizontal rollers for conveying the curved plates, and a trough in which said rollers are placed, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN HENRY SMITH.

Witnesses:

EDWIN DODDS,
J. SMITH GREEN.